



Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

Plant Biosecurity

Producer Guide to the National Farm-Level Biosecurity Standard for Potato Growers

A Guide to Developing Your Farm Biosecurity Plan



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CFIA P0839-13
Catalogue No.: A104-108/2013
ISBN: 978-1-100-54468-7

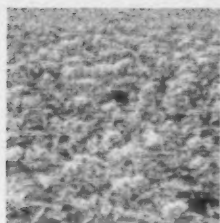
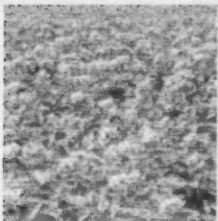


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Glossary

Biosecurity: A series of management practices designed to prevent, minimize, and control:

- the introduction of pests and diseases into a production area or farm;
- the spread of pests and diseases within a production area or farm; and
- the movement of pests and diseases off the production area or farm.

Biosecurity plan: A written code of uniquely designed practices to prevent, minimize, control, and contain pest and disease movement onto, spread within, and off a potato farm.

Controlled access zone (CAZ): A farm, area on the farm, or field area where access is restricted or otherwise controlled.

Crop: Plants, plant products, and other products that may be produced by a grower, producer, or operator for sale, including potatoes, fruits, other vegetables, grains, and horticultural plants including trees.

Disease: An impairment of the normal state of the potato plant or tuber caused by bacteria, fungi, virus, etc.

Disinfect: Sanitization of equipment, footwear, and surfaces of storage facilities with a chemical solution.

Farm: A tract(s) of land (commonly referred to as a farm unit) used for the purposes of potato, rotational, and other crop production. The farm includes residences and all farm storages, buildings, and structures, as well as fields (remotely located) used for the production of a crop.

Farm equipment: Tractors, farm machinery and implements, excluding vehicles.

Farm vehicles: Farm vehicles, such as trucks, pickups, and all terrain vehicles either used on the farm or used to deliver potatoes to the market.

Field: An area designated for the production of potatoes or other crops.

High-generation seed: A general reference to Seed Potatoes of Nuclear, Elite I, Elite II, and potentially Elite III class of seed potatoes

Off-farm vehicles: Vehicles, such as trucks, not originating on the farm that come to the farm to pick up or deliver potatoes, fertilizer, chemicals, building supplies, and other crops. This does not refer to farm vehicles.

Pathways: Routes by which pests and diseases can be introduced from one location to another.

Pest: According to the *Plant Protection Act*, anything that is injurious or potentially injurious, whether directly or indirectly, to plants or to products or by-products of plants, and includes any plant prescribed as a pest.

Post-harvest test: A test, either laboratory or field grow-out (or both), of samples taken according to a protocol from a seed potato lot to determine the absence or the presence of disease that may be expected when the seed is used to produce a crop the following year.

Practice: A procedure(s) that is followed by the operator(s), without necessarily being written or detailed to the extent of a protocol.

Prevention: The preclusion of the introduction or movement of potato diseases and pests.

Producer: One who owns or rents land for crop production.

Producer guide: Document that contains examples of beneficial practices designed to facilitate the implementation of the *National Farm-Level Biosecurity Standard*.

Production area: A field designated for cultivation of potatoes and rotational crops.

Property: The land on which the production area(s) are located, including all farm buildings and structures.

Protocol: Defined and written procedures, which detail the steps to be followed to achieve an objective; for example, disinfecting a piece of farm equipment.

Quarantine pest: A pest of potential economic importance to the endangered area, though not yet present there, or present but not widely distributed and being officially controlled.

Regulated non-quarantine pest: A pest, (pathogen, weed, or insect), that is injurious or potentially injurious, whether directly or indirectly, to potato plants or tubers, and is regulated through provincial and/or federal regulations.

Restricted access zone (RAZ): An area, generally located inside the controlled access zone, where access by people or equipment is further restricted.

Rogue: Removal of diseased or unwanted plants and plant parts.

Seed potatoes: Potatoes recognized as meeting the requirements defined in the *Seeds Act and Regulations*.

Service vehicles: Vehicles used by various service providers visiting the farm to provide a specific service, such as electrician, plumber, heating specialist, crop specialists, or inspectors.

Staff: People who are hired or are volunteering to work on the farm.

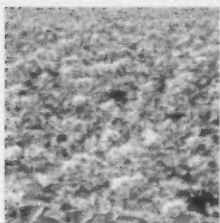
Tare soil: Any soil falling off potato tubers during delivery to storage, grading, handling, and packing.

Target outcome: A goal that all potato producers, regardless of the size of their operation, should try to implement to protect their farm and crops from the introduction and spread of diseases and pests.

Vector: A living organism that is capable of transmitting a pest from an infected source to a host.

Visitor: Any non-farm personnel who arrives at the farm (including salespersons, inspectors, delivery people, contractors, friends/relatives of farm personnel).

Volunteers: Potato plants resulting mainly from tubers or tuber parts and from true potato seed remaining in the soil from the previous year.



Why is Potato Biosecurity Important?

The sustainability of the potato industry in Canada depends on biosecurity practices on farms to prevent, minimize, and control the introduction of pests and diseases. History has demonstrated that a pest incursion on a farm can have devastating long-term consequences for the affected farm, region, and country (e.g. potato cyst nematode, potato wart). The development of a farm biosecurity plan will define and formalize many of the risk reduction practices that are already in place in your day-to-day operations and assist you in addressing potential biosecurity gaps that may exist in your current operation.

Adopting biosecurity best practices is a way to support the objectives of your farm business plan. Effective prevention of disease and pest occurrences protects productivity, stabilizes production costs, and protects the value of your farmland. The Farm Biosecurity Plan will also contribute to protecting the long-term investment in your farm operation.

Your Farm Biosecurity Plan may assist in retaining customers or attracting new markets. The enhancement of biosecurity practices at the farm level will help you in addressing customer expectation, whether locally, nationally, or internationally.

The practices described in this document and included in a Farm Biosecurity Plan will reduce the risk of introducing a wide variety of pests and diseases into your farm operation. These include

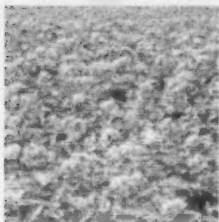
- pests or diseases unknown to exist in Canada (i.e. brown rot).
- quarantine pests and diseases known to occur in Canada (i.e. potato cyst nematode, potato wart).
- non-quarantine pests and diseases (i.e. bacterial ring rot, late blight).

Biosecurity best practices reduce the risk of pests or diseases on the farm by targeting the possible pathways of introduction, including soil, seed, air, water, and various vectors (insect, human, animal) that are capable of transmitting a pest from an infected source to a host. A pathway-targeted approach also protects against unknown pests and diseases. Although diseases and pests may come and go, the major pathways (Table 1) remain the same.

Table 1 Major pathways associated with some pests and diseases¹

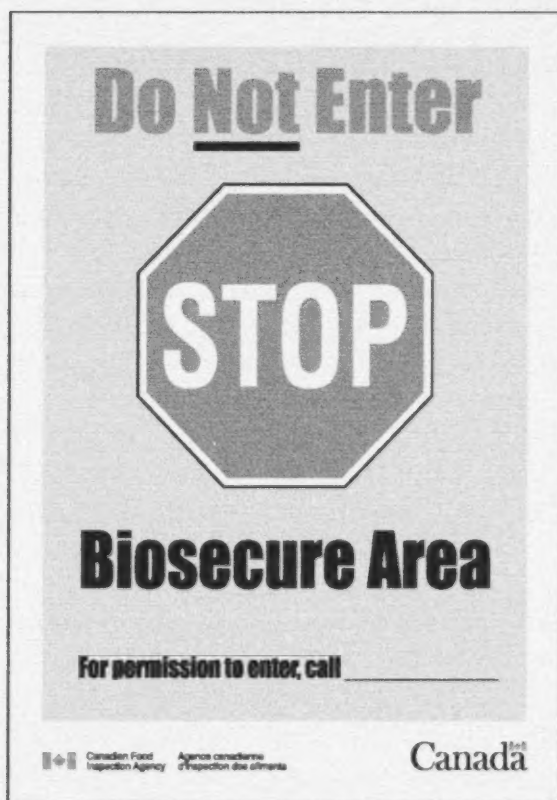
Pests and Diseases	Soil (including erosion)	Seed	Air	Water (used for irrigation, cleaning and disinfection)	Common vectors
Potato cyst nematodes (PCN)	✓	✓		✓	
Potato wart	✓	✓			
Powdery scab	✓	✓			
Bacterial ring rot		✓			
Late blight		✓	✓		
Blackleg		✓		✓	
Virus		✓			Aphids, nematodes, fungi
Brown rot	✓	✓		✓	
Weeds	✓	✓	✓	✓	Birds, animals

¹ These checkmarks are provided as examples of high-risk pathways of introduction. Other pathways may also be possible.



Who Is Responsible for Farm-Level Biosecurity?

Potato producers have the ultimate responsibility for protecting the health of their crops and farm. However, service providers and other visitors to the farm should also observe and respect the biosecurity practices that have been implemented and communicated by the producer.





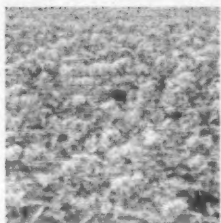
What does a Biosecurity Plan Look Like?

A Farm Biosecurity Plan could consist of a detailed farm map(s), and farm policies and procedures regarding farm property management, farm operational management, and plant health management. Documenting these policies and procedures would benefit consistent application and demonstrate to current or future customers that your farm operates under biosecurity practices.

Other programs such as CanadaGAP™, which may already be operational on your farm, have components that apply to biosecurity, and those can be referenced as part of your Farm Biosecurity Plan.

The Farm Biosecurity Planning Tool (FBPT) – Appendix A – will assist you in developing your Farm Biosecurity Plan. The Planning Tool is a guiding document that allows for determining and recording existing biosecurity practices. Working through this tool may identify gaps in your current biosecurity practices and thus provide opportunities for enhancement.

The Farm Biosecurity Plan should be reviewed and updated regularly as new biosecurity information becomes available or if there are changes to your farm operation.



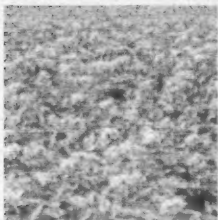
About the Producer Guide

This Producer Guide has been developed to assist with developing a Farm Biosecurity Plan by providing guidance on strategic practices that may be adopted to enhance your current farm biosecurity. The Producer Guide provides information on biosecurity practices that can be implemented at the farm level to achieve the Target Outcomes of the National Farm-Level Biosecurity Standard for Potato Growers.

The Farm Biosecurity Plan will differ from one farm to another, as biosecurity practices and requirements vary, depending upon factors such as the operation size and geographical spread, rotational crops, and the type of potato production. For example, a large geographically diverse farm, or a seed potato farm, may require more extensive Farm Biosecurity Plans compared to a contiguous farm or a processing or table-stock operation. Developing and implementing a Farm Biosecurity Plan that is appropriate for your operation and that, ultimately, enhances the protection of plant health is an important factor.

Target Outcome:

To enable potato producers to develop and implement a farm-specific biosecurity plan that provides a systematic approach to minimizing the introduction and spread of pests and diseases, both at the farm-level and across Canada.



How Should I Use the Guide?

The Producer Guide, developed in conjunction with the National Farm-Level Biosecurity Standard for Potato Growers, together with the Planning Tool, can assist in developing your written biosecurity plan. Similar to the Standard, the Planning Tool follows three primary themes:

- 1. Farm property management**
- 2. Farm operational management**
- 3. Plant health management**

There are basically four steps in developing the plan:

- Step 1:** Complete the Planning Tool to determine your current level of biosecurity.
- Step 2:** Consult the Producer Guide and the National Farm-Level Biosecurity Standard for Potato Growers on each of the points included in the Planning Tool to learn about ways to enhance that element of biosecurity on your farm.
- Step 3:** Develop and document your plan. This may involve creating policies and procedures that describe the elements of the biosecurity plan, and explain how they will be carried out on the farm.
- Step 4:** Review the plan on a regular basis, modifying to reflect the current situation on your farm.

1.

Understanding the Concepts: Farm Property Management

Target Outcome:

Detailed map(s) are used in the development of the farm biosecurity plan to identify potential access points for pests and diseases, pathways for pest and disease transmission, designated areas, and traffic flow. New construction and renovations are designed to enhance existing biosecurity measures.

This section addresses the geographical layout of your farm and the biosecurity opportunities that are associated with new construction and renovations.

1.1 Farm Facility Location and Layout

A detailed farm map is an important part of a farm biosecurity plan. Maps provide a visual perspective of the overall layout of the farm and help producers to better understand how:

1. the access points to their operation may serve as pathways for diseases and pests (weeds, insects, nematodes);
2. the layout and location of fields, buildings, and designated areas (cleaning and disinfecting) may reduce or increase the biosecurity risk.

Examples

- The biosecurity risk to a high-generation seed potato field is **increased** if planted adjacent to a field planted with lower-class seed.
- The biosecurity risk associated with visitors to the farm is **reduced** if cleaning and disinfecting facilities are located in close proximity to the visitor entrance.

An existing farm map, including one used for the Environmental Farm Plan or CanadaGAP™, can be effectively used as the start for your biosecurity map. Alternatively, use a detailed physical map or aerial photo.

Your map should include

- all buildings;
- all production fields, including fields with rotational crops and traded land;
- all farm roads and field access points;
- the main entrance where all visitors and deliveries arrive;
- designated parking for visitors and staff;
- cleaning and disinfection areas; and
- geographical features such as forested areas, streams, drainage directions.

Considerations for your farm location and layout:

- Locate cleaning and disinfecting facilities near a main access point to allow for inspection, and cleaning and disinfecting of equipment, vehicles, etc. that must enter the farm.
- Establish a dedicated staff and visitor entry, where cleaning and disinfection capacity is readily available.
- Create a dedicated parking area for visitors and staff to reduce the risk of non-farm vehicles introducing plant material and soil (and associated pests and diseases) onto and within the farm.
- Foster an awareness of the risk associated with the geographical aspects of your farm, and with wind and waterborne diseases or pests to enable better assessment of disease risk on your farm.

Example

- Soil-borne pathogens can move in the sediment associated with surface run-off or floodwaters thus resulting in a risk factor for fields that are subject to flooding or receiving run-off water.
- Plant higher-generation seed in isolation, or if impossible, consider what is being planted in neighbouring fields.
- Outline the appropriate routes for on- and off-farm vehicles to travel when moving around the farm.

1.2 New Construction/Renovations

When renovating or constructing a new building, there are biosecurity elements to consider in maintaining or enhancing biosecurity measures on your farm. Plan the location and purpose of a new building in context with the farm layout. Depending on the purpose of a new building, it may be best located inside or in close proximity of an existing biosecurity zone or cleaning facility. Similarly, to effectively control access to the building, the location of the entrance and exit doors should be strategically considered.

Effective cleaning and disinfecting is best achieved on clean, hard, non-porous surfaces. When designing new buildings, or undertaking renovations to existing structures, consider materials that are easily cleaned and disinfected, especially for those exposed surfaces that come in direct contact with potatoes.

Examples

- concrete rather than dirt floors
- steel storage walls instead of wood
- plastic bins instead of wood

In situations where materials such as wood and other porous materials must be used, it is important to conduct thorough cleaning. Increased contact times with disinfectants on cleaned porous surfaces may also help to maximize the effectiveness of cleaning and disinfecting procedures.

Biosecurity risks are associated with construction activities, due to the movement of materials, people, and equipment. The farm biosecurity plan should be considered during the planning and work phase of any construction and renovation project to ensure that the integrity of the plan is maintained.



2.

Understanding the Concepts: Farm Operational Management

Farm operational management focuses on the day-to-day farm activities and how they relate to biosecurity. The following information has been developed with an understanding of pest and disease pathways and the associated biosecurity risks. The recommended best practices described in this section should be implemented to reduce the biosecurity risk associated with the movement of people, vehicles and equipment, and the disposal of potato waste.

2.1. Establishing Biosecurity Zones

Target Outcome:

Controlled Access Zones and Restricted Access Zones, are established and identified with appropriate signage to prevent the entry, or contain the spread, of pests and diseases.

Biosecurity zones are areas on your farm where the access is controlled in order to

- **protect** a field, crop, or building from becoming infested or contaminated with a pest or disease.
- or
- **contain** a disease or pest within an affected area (e.g. field, storage building) to prevent the spread to other locations outside the zone.

When a biosecurity zone is being established, the risks associated with the movement of a pest or disease in or out of a zone must be assessed. Risk is assessed by understanding the pathways of how diseases and pests may enter or leave a zone, as outlined in Table 1.

To be effective, visibly identify and control these zones, understanding their importance ("to protect or to contain").

These zones are typically referred to as Controlled Access Zones (CAZs) and Restricted Access Zones (RAZs). Procedures to enter and leave Restricted Zones are generally more restrictive than those for Controlled Zones.

Examples of CAZs

- production fields
- potato storages
- other areas where access controls may be needed

Examples of RAZs

- laboratory and greenhouse used for the production of seed potatoes
- high-generation seed potato fields
- seed potato storages
- a field infested with a disease such as late blight or bacterial ring rot
- a field with the confirmed presence of a soil-borne pathogen or pest (i.e. *Spongospora subterranea*, causal agent of powdery scab; stubby root nematode; *Plasmodiophora brassicae*, causal agent of clubroot of canola).

The reason why a zone is designated as a restricted zone (to protect or to contain) should be considered when determining appropriate workflow procedures.

Examples

- When a restricted zone is created to protect a high-generation seed field, begin work in this field, and then move to lower-class seed fields.
- When a field is a restricted zone to contain a soil infestation due to a soil-borne pest, visit the restricted zone last in the farm workflow.

Ideally, in situations where a farm has both seed and commercial production, there should be complete separation of these operations. If there is not complete separation, the entire farm must be considered as a seed potato farm unit, and the owner must declare to the Canadian Food Inspection Agency (CFIA) all fields planted with potatoes and must meet certain minimum biosecurity requirements.

Complete the cleaning and disinfection of equipment and personnel before entering the restricted zone when its zone is to protect against introduction of pests and diseases into that zone. When the purpose of a restricted zone is to contain a pest, it is critical to take measures to clean and disinfect equipment and personnel as they exit to prevent any further spread. This minimizes the transfer of soil, plant material, and any associated pests and diseases into or outside of the zone, depending on its purpose.

Considerations for establishing and managing Biosecurity Zones:

- Identify all CAZs and RAZs on the farm map.
- Post signage with directions on recommended biosecurity practices at main access points and in high-risk areas.
- Assess equipment for soil and plant debris, and clean and disinfect as required before moving between zones.
- Remove soil and plant debris from staff and visitors' footwear and clothing; if necessary, clean and disinfect the items when moving from a CAZ to a RAZ.
- Assess the previous whereabouts of staff and visitors before entering and exiting the biosecurity zones.

Soil-borne pests – namely, potato wart and potato cyst nematodes – can survive in the soil for long periods of time (over 20 years).

Fully assess the cropping history and previous usage of newly acquired or leased fields for potential diseases and pests before the area is brought into production or fully incorporated into the farm.

Assess the risk of newly acquired land by considering the following:

- What is the production history or previous use of the land?
- Was there an old farm or homestead located on the site?
- Has the land been used as a home garden or to produce potatoes?
- Has the land been used regularly to hold and feed livestock with potatoes?
- What are the history and the results of soil testing for specific pests and diseases such as potato cyst nematodes or *Verticillium* spp.?

2.2 Movement of People (Protocols, Communication, and Training)

Target Outcome:

Farm personnel, visitors, including service providers, are trained and/or informed of and comply with the farm biosecurity protocols.

People coming onto the farm can unknowingly bring diseases and pests. Soil on footwear and clothing, including used work gloves, may contain soil-borne pests, fungal spores, bacteria, or weed seeds. Even people's hands that do look fairly clean may carry bacterial and fungal pathogens.

To reduce the biosecurity risk associated with the movement of people on the farm, develop policies and procedures to reduce the risk, posed by farm personnel and visitors. Once developed, communicate these policies and procedures to all those who enter the farm, and provide training to farm personnel.

Clothing, footwear, and hands could harbour pathogens invisible to the naked eye (e.g. late blight spores, ring rot bacterium).

Considerations for biosecurity protocols or procedures that relate to the movement of people:

- Maintain a visitor and service personnel log book.
- Require that all staff and visitors clean and disinfect their footwear upon entry, with provision of the following options:
 - disposable boots for visitors
 - dedicated footwear for staff for farm or for RAZ use
 - footwear washing facilities and disinfectant dip pansIf using dip pans, ensure to maintain in order to keep the disinfectant effective. Follow the guidelines on provincial fact sheets, where they exist, or the disinfectant manufacturer's recommendations for mixing rates, contact time, and schedule for changing the disinfectant solution. Be aware that footwear should be cleaned before dipping, as soil and organic matter reduce the effectiveness of most disinfectants.
- Put on protective over-wear, if deemed necessary, before entering a RAZ.
- Provide staff with clean dedicated gloves, or instruct them to wash hands prior to working in a greenhouse.
- Train staff in proper cleaning and disinfection requirements, and to report any deviation in procedures.
- Ensure that visitors contact the producer before entering the farm, that they are briefed on biosecurity measures, and that their visit is documented.
- Escort visitors while on the farm.

2.3 Movement of Vehicles and Equipment

Target Outcome:

All vehicles and equipment, especially those of service providers, are assessed for biosecurity risks, and are cleaned and/or disinfected, when necessary, on entry and exit from the farm, and/or when moving between CAZs and RAZs.

The movement of vehicles and equipment entering and travelling within your farm is a potential risk pathway for introducing pests and diseases. Vehicles and equipment, for example, may have clinging soil or crop debris that could harbour pests or pathogens. There is a lot of vehicle and equipment traffic on a farm, and cleaning and disinfection of all vehicles and equipment is not practical. However, vehicles and equipment can be a high risk for disease and pest introduction.

High-risk vehicles and equipment:

- off-farm machinery such as custom applicators, equipment shared with other farms, and vehicles of service providers (agronomy services); and
- newly purchased used equipment (especially if used for farm demonstrations prior to purchase).

Protocols and procedures directed at the movement of vehicles and equipment must be practical and effective at reducing the biosecurity risk.

The requirements for cleaning and disinfecting off-farm vehicles and equipment upon entering and exiting the farm should be determined by risk as follows:

- What area of the farm will they be visiting?
- What is the nature of their visit/work?
- Will they be entering controlled or restricted zones?
- Have they recently visited another farm?
- Is there visible soil and/or debris on their vehicle/equipment?

Considerations for biosecurity protocols or procedures that relate to the movement of vehicles and equipment:

- Maintain a record of cleaning and disinfection.
- Require off-farm vehicles (e.g. service, easement activity, inspection, survey, and vehicles) to remain on designated access roads, and refrain from driving into fields.
- If field entry is required, ensure that the vehicle is free of soil and plant debris.
- Establish traffic-flow patterns in accordance with biosecurity zones (as described in 2.1).
- Minimize the movement of equipment over wet soil to avoid excessive movement of soil, and facilitate any required cleaning.

2.4 Waste (water, plant, and soil)

Target Outcome:

A farm waste management program for all potato, soil, and waste water is established and implemented to contain any potential plant pests and diseases.

Potato culls, rogued plants, soil (tare and sediment from wash water), waste water, and used packaging materials are high-risk pathways. The pests and diseases that these materials may contain can easily spread to growing potato crops on your farm and to other farms in the area if no containment measures are in place.

All waste disposal should be done in accordance with existing federal, provincial, and municipal legislation.

Considerations for Waste Disposal:

- Cull potatoes can be
 - buried in an area not used for the production of a crop, nor close to natural watercourses. They should be placed in a trench and covered with at least 50 cm of soil.
 - spread on a field during the late fall or winter; this timing allows for multiple cycles of freeze/thaw that destroy the viability of the tuber, and speeds up the time required to break down this material. Ideally, field spreading of culls would be done on the field in which they were produced, and the depth of the potato layer should be no greater than 15 cm.
 - fed to livestock. Potatoes should not be stockpiled or otherwise stored outside. Storage should take place inside a building, covered with a tarp or ensiled. If cull potatoes are sent off-farm, the livestock producer, feed manufacturer, or others must be made aware of these storage recommendations. Manure from potato-fed animals should not be returned to land used to produce potatoes.
 - composted, using appropriate mixing ratios and management practices to ensure the temperature within the pile is sufficient to destroy pests and diseases.
- Immediately remove rogued plants, including any tubers from the field, and avoid contact with other plants, and dispose of properly through
 - burial in an area not used for the production of a crop, nor close to natural watercourses. The rogued material should be placed in a trench and quickly covered with soil.
 - containment of the material in plastic bags or other strong closed containers and disposed of in a municipal waste management program.
- Return tare soil to the field of origin.
- Dispose of sediment from washing in a burial site or in an area that will not be used for potato production. Avoid spreading on potato fields.

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- Keep areas around water sources free of potato crop waste and other potential sources of infestation. Water from these areas should not flow to production areas.
 - Contain or drain away water from cleaning and disinfection of production and traffic areas to a separate septic system or drainage area.
 - Treat waste water and sediment resulting from washing and/or fluming prior to using for irrigation or returned to fields (e.g. contained in separate retention pools).
 - Avoid reusing packaging materials, such as jute, because they cannot be effectively cleaned or disinfected.

Dispose of all forms of waste on a regular basis. This is most important during the spring and summer months to avoid rapid transmission to growing crops and contamination of the land used to produce potatoes.

3.

Understanding the Concepts: Plant Health Management

Plant Health Management includes all activities on your farm that focus on the prevention, monitoring, and management of pests and diseases. By working through this section, you may become aware of opportunities to enhance the current level of plant health that may be incorporated easily into your farm biosecurity plan.

Target Outcome:

A plant health management plan is established and implemented.

3.1 Prevention Management Practices

Target Outcome:

Seed potatoes and other crop inputs (e.g. fertilizer, manure) are sourced and managed to minimize the introduction and spread of pests and diseases.

Maintaining a high level of plant health on your farm is best achieved by taking a preventative approach to managing diseases and pests, and is the fundamental basis of on-farm biosecurity.

Considerations for Prevention Management Practices:

- Follow good sanitation practices, such as regular cleaning and disinfection of farm equipment. Clean and disinfect seed handling and processing equipment (i.e. seed cutters, conveyors, diggers, harvesters, and planters) between seed lots.
- Plant certified or higher-generation seed that has been post-harvest tested and procured from a known and reliable source.²
- Develop a relationship with your seed suppliers to become familiar with their operations (i.e. crop production and farm management practices). Ask seed suppliers about the biosecurity measures implemented on their farm.

² Ensure that third parties or brokers are sourcing seed potatoes from suppliers that implement biosecurity measures on their farm.

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- Rotate potatoes regularly with crops that do not host the same pests and diseases. Longer rotations reduce some pest and disease pressure and risk.
 - Ensure that seed used for the production of rotational crops is certified or cleaned and free of weeds and soil.
 - Use pest- and disease-resistant varieties where possible.
 - Apply fungicides preventively and according to disease risk. Insecticides are applied according to pest risk as determined by field scouting and economic thresholds, if available.
 - Establish strategies to control weeds and volunteer plants. Use cover crops to control weeds and to reduce soil movement by erosion.
 - Implement a pesticide-resistance management strategy, including the rotation and/or tank mixing of pesticides from a chemical group with a different mode of action.
 - Ensure that staff is trained and knowledgeable of potato pests and diseases, and crop production practices. The training includes awareness of federal, provincial, and municipal regulations pertaining to potato production.
 - Consult a professional agronomist or other professional, as required.
 - Establish on-farm compost and management programs, and comply with existing regulations and guidelines. Source and manage manure, compost, or other soil amendments to minimize the introduction and spread of crop pests.

3.2 Surveillance

Target Outcome:

A surveillance program is developed and implemented for early detection, identification and control of pests and diseases.

The Surveillance Program should designate trained personnel to conduct scheduled in-field scouting and monitoring for pests and diseases. Early detection provides the greatest opportunity to successfully manage, contain, and minimize the damage that can be caused by pests and diseases.

Considerations for Surveillance:

- Designate farm personnel to conduct the Surveillance Program after receiving training on scouting methods, pest and disease identification, and application of economic thresholds, if available.
- Begin scouting at the start of the season and continue on a regular basis. The frequency may need to be adjusted as required, based on pest and disease pressures.
- Maintain accurate surveillance reports that record the populations of pests and diseases that are present (including absence), and other crop-health indicators such as fertility and moisture conditions.

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- Consider the latest information from pest and disease alerts for your area, modifying your surveillance program accordingly.
 - Refer any unusual, unidentified pest or disease that is detected to extension personnel, a professional agronomist, or a diagnostic laboratory for identification.

3.3 Response Plan

Target Outcome:

A response plan is developed and ready for implementation to effectively contain and control pest and disease outbreaks.

Identifying a pest or disease outbreak via regular monitoring allows for early implementation of the Response Plan, and aims to minimize the impacts on your farm and on neighbouring operations. The Response Plan should define responsibilities of farm personnel and establish procedures to contain, manage, and control the pest or disease outbreak.

Considerations for a Response Plan:

- Designate farm personnel to review the surveillance reports, having the authority to activate the Response Plan based on the information provided.
- Ensure that efficacious management and control options, if applicable, are readily available for immediate use once a pest or disease outbreak is detected.
- Immediately implement containment measures to prevent the spread within the farm and to neighbouring farms. Containment may require that infested fields be immediately isolated in terms of the movement of equipment and people to prevent the spread of the pest or disease.
- Designate any infested area as a Restricted Zone, and implement strict containment measures.
- Ensure contact information for the CFIA and/or provincial ministry of Agriculture officials is readily available if a quarantine pest or disease is identified or suspected. Federal (and occasionally provincial) law requires the reporting of quarantine, and regulated non-quarantine pests and diseases.

APPENDIX

A

Farm Biosecurity Planning Tool

The Reference/Notes column may be used to cite an existing document (e.g. detailed maps) found in the Farmstead Section of your Environmental Farm Plan (EFP). The grower can also use this section to refer to procedures that are found in existing programs

	Current Situation ✓ or ✗	Opportunity for enhancement	Reference Notes
1. Farm Property Management			
1.1 Farm facility location and layout			
Detailed maps are available that identify farm facilities and geographical considerations. For example, buildings, production areas, designated receiving areas, inspection and cleaning area, storage facilities, roads, borders, fences, designated parking for visitors and farm personnel, natural drainage patterns, water courses, drain tile, and topographical details.			
Maps of newly acquired or leased land are available.			
1.2 Construction			
New facilities are designed with consideration to minimizing the potential for introduction and spread of pests. Facilities are built with materials that can easily be cleaned and disinfected.			

	Current Situation ✓ or ✗	Opportunity for enhancement	Reference Notes
2. Farm Operational Management			
2.1 Establishing Biosecurity Zones			
RAZs and CAZs are established and managed, based on assessed risk and production type (seed, table, processing) or a combination of production types.			
Clearly visible signage that identifies access points for restricted and control areas. Signage should provide contact numbers of farm personnel.			
The history of and previous used newly acquired or leased land are assessed prior to bringing land into production.			
2.2 People, communication, and training			
The plan includes considerations for visitors, service providers, and farm personnel.			
A logbook is maintained for visitors and service providers.			
Service providers are made aware of farm-specific biosecurity protocols, and are asked to comply with the protocols prior to providing service on the farm.			
Trained farm personnel escort visitors to ensure they comply with the biosecurity protocols when in biosecure areas.			
There is a farm personnel biosecurity training program (written, implemented, and regularly updated).			

	Current Situation ✓ or ✗	Opportunity for enhancement	Reference Notes
2.3 Movement of Vehicles and Equipment			
The risk associated with the movement of vehicles and equipment is assessed, including the consideration of previous use, previous location of used, location of used within the farm and destinations upon leaving the farm.			
Based on the risk determined by the assessment, vehicles and equipment are cleaned to remove soil, organic matter, crop waste, and weeds prior to entry to the farm and/or leaving the farm.			
2.4 Waste (water, plant, and soil)			
Waste water and sediment that result from washing and/or fluming is not re-used on agricultural land unless treated.			
The biosecurity plan includes handling, transportation, storage, treatment, and disposal of plant and soil waste (culls, cuttings, rogued plants, and tare soil).			
3. Plant Health Management			
3.1 Prevention Management Practices			
Designated farm personnel or crop scouts are trained to recognize and report weeds, insects, and diseases, including emerging pests.			
Only certified seed potatoes are planted on the farm, post-harvest test results are considered and provincial potato-planting regulations respected.			
Seed for rotation crops are certified and/or cleaned for weed seeds and soil.			

	Current Situation ✓ or ✗	Opportunity for enhancement	Reference Notes
A crop rotation plan that considers disease, insect, and alternate host lifecycles is in place and followed.			
Crop and pest management records are maintained for each field.			
Manure, compost, or other soil amendments are sourced and managed to minimize the introduction of pests.			
3.2 Surveillance			
Surveillance activities are described, implemented, and recorded.			
3.3 Pest Response Plan			
A Plan has been established to respond to suspected and/or confirmed detection of any quarantine pest.			
A Plan has been established to respond to the presence of a regulated non-quarantine or economically important pest or disease.			
Biosecurity Plan			
A systematic biosecurity plan (based on the criteria identified above) has been developed, documented, and implemented, and its effectiveness is assessed on a routine basis to improve the plan.			

APPENDIX

B

Acknowledgements

Advisory and Technical Committees

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